SHORT RESUME/ SYNOPSIS OF PH. D TOPIC

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"STUDIES ON HELMINTHIC FAUNA OF FRESHWATER FISH SPECIES OF THE GENUS *CHANNA*"

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ABSTRACT OF PROPOSED WORK PLAN/ PROBLEM

1. Introduction:

India is the third largest producer of fish in the world and second in inland fish production. Fisheries are important for the Indian economy as it provides employment opportunities; it is a source of nutritional food and foreign exchange earnings. The fishes are said to be "gold" from water. Fish is a vital source of human food particularly in terms of high quality proteins. For the people of India in general, and Maharashtra in particular, fish constitutes a major component of diet. Being a cheap source of animal protein, there is more emphasis on the culture of fishes in recent times.

In tropical countries like India where there is increasing protein demand fishes acts as a cheap source of animal protein. It is known for its protein value, high content of essential minerals and for being low in saturated fats. Hence to obtain healthy and quality fish meat, it is necessary that the fish should be free from all types of pathogens like viruses, bacteria, algae, protozoans, helminths, annelids, arthropods and molluscs. Helminth parasites are hazardous to a number of fish species in every type of water body. Each helminthes parasite species prefer to live in a definite zone of the microhabitats, though some can migrate to the other organs, which are normally not their usual site of infection. Parasite interferes with nutrition, metabolism and secretory function of alimentary canal, damage nervous system and even upset the normal reproduction of the hosts. The major group of parasites in freshwater fishes is trematodes, cestodes , nematodes which cause infection. Besides these, there are a number of parasites which are transmitted to human beings only through fish. These parasites decrease the rate of growth as well as the reproduction rate of the fish, resulting in loss of potential food and economic loss to the culturist.

Channa is a genus of predatory fish in the family Channidae, commonly known as snakehead, native to freshwater habitats in Asia. This genus contains more than 45 scientifically described species. The genus has a wide natural distribution extending from Iraq in the west, to Indonesia and China in the east, and parts of Siberia in the Far East. A particularly high richness exists in Myanmar (Burma) and northeastern India, and many *Channa* species live nowhere else. In contrast, a few widespread species have

been introduced to several regions outside their natural range where they often become invasive. The large and medium-sized *Channa* species are among the most common staple food fish in several Asian countries and they are extensively cultured. Apart from their importance as a food fish, snakeheads are consumed in some regions as a traditional medicine for wound healing and reducing post-operative pain and discomfort, and collected for the international aquarium pet trade. All snakeheads are highly predatory and the diets of the various species of *Channa* include fish. *Channa* is considered to be most delicious fish in Maharashtra.

Parasites of fish constitute one of the major problems to fish health. Besides the direct losses caused by mortality, parasites have considerable impact on growth, resistance to other stressing factors, susceptibility to predation, marketability and pave way for secondary infections. Fish play an important role in Indian economy. Mortality of fishes occurs due to heavy infestation of parasites. For that reason the present work is proposed to investigate the Biosystematic studies on Helminthic fauna of freshwater fish species of the genus *Channa* from Nanded District M.S. India.

2. Review of Literature and Development in the subject (Previous work done in the relevant area**):**

Studies on helminth parasites of fishes were initiated in early 19th century itself by scientists, but they received momentum in the 20th century. Till date, around 30,000 species of helminth parasites have been recorded from freshwater fishes.

Many researchers have studied different aspects including Taxonomy, diversity, biochemistry, histopathology, ecology and population dynamics of helminths of fishes since last 50 years. A considerable amount of work on the metazoan parasites in these selected fishes has been contributed by the scientists all over the world. There are some pioneer workers in the world. Notable contributions to the biology of fish helminthes field were made by Yamaguti, S. (1934, 1958, 1959,1961), Woodland (1923, 1924), Woolcock (1935), Anderson (1976), Wardle, R. A., McLeod, J. A. and Radinovsky, A. (1974) etc. In India, some of helminthologists who made extensive work in this fields are Johri (1959), Moghe (1925), Bhalerao (1932, 1937), Thapar, G.S. (1938), Sood, M.L.(1968) Ramadevi (1973), S.M.Ali (1956), M.Z.Chishti (2004), R.Madhavi (2007), Nama, H.S. (1974), S.P.Gupta (1953), Pandey, K.C.(2007), Tandon V. (2005), H. S. Singh (1995), Malhotra & Capoor (1980), Shinde, Jadhav, Hiware, Nanware, Bhure & his group (1970, 1980, 1984, 2005 & 2006,2008,2015,2016), etc.

3. Objectives of Research/ Proposed Hypothesis:-

The objectives of the proposed study are as follows:

- To make survey of freshwater fish species of the genus *Channa* from Nanded District for Biosystematics of Helminths.
- To identify Taxonomically Helminth parasites of freshwater fish species of the genus *Channa*.
- To study population dynamics of Helminthic fauna of freshwater fish species of the genus *Channa* for incidence, intensity, density and index of infections.
- To study Biochemical Profile (Glycogen, Protein and Lipid contents) of Helminths and its host tissue of freshwater fish species of the genus *Channa*.

4. Methodology to be adopted:

Freshwater fish species of the genus *Channa,* for present investigation will be procured from local fishponds and fish markets of Nanded Region, M.S. India. Identification of fish host will be made with help of classical works of Day (1865,1867, 1869,1875-1878,1879,1889), Jayram,(1981).

Helminths collected from freshwater fish species of the genus *Channa* will be identified by -

1. Systema Helminthum Vol.I to III- By Yamaguti, S. (1958,1959, 1961)
2. Handbook of Tapeworm identification –By Gerald D. Schmidt (1934)
3. Helminths, Arthropodes and Protozoa of Domesticated Animals-By Soulsby E.J.L. (1982)
4. Keys to the Cestode Parasites of Vertebrates- By Khalil, Jones and Bray (1994)

- Population Dynamics Will be recorded and calculated according to Margolis et.al., 1982.
- Biochemical contents will be estimated by following standard methods.

  1) Glycogen will be estimated by Kemp et. al., method (1954)

  2) Protein will be estimated by Gornall et. al., method (1949)

  3) Lipid content will be estimated by Folch et.al., method (1957)

Study Area:- Different collection sites of host in Nanded District of Maharashtra State, India.

5. Importance of Study:

The present study will be able to increase understanding about biosystematics, population dynamics and biochemical profile of Helminths of freshwater fish species of the genus *Channa* in Nanded Region, which will help to design control strategies for this major parasitic group.

- **International Status-**

Helminths are commonly found in both wild and cultured fishes. Zoonotic infections (infections of animals that also infect man) are being caused by eating raw or under-cooked aquatic food including fishes. There are various modes in which pathogenic effects of parasites on hosts manifest themselves. The parasitic infections are sometimes very fatal and can cause high mortalities. Helminth parasitization is one of the major factors responsible for decline of fish fauna worldwide. Due to the global incidence of helminth infections in fishes, their detail study would give proper identification of these infections and help reduce them by designing control measures.

- **National Status-**

The fish culture in India has transformed into a main commercial activity in the past two decades. But the intensification and expansion of fish culture is facing a severe threats from pathogens as they are the prime cause for chronic mortalities and poor growth thus, affecting the yield and marketability of fishes. Various workers in different parts of India have studied the diversity of helminth fauna in India. It is expected that, Application of therapeutic measures to get rid of these pathogens requires a sound base of taxonomy.

- **Significance of the study-**

Channid fish are the favorites of people because of their delicious flesh and versatility for cooking. If these fish have been prepared with unhygienic cooking methods, there is the possibility of getting parasitic infection from the infected fish. Previously, there were only a few studies of parasitic infection of channid fish from this region. To fulfill the essential need for knowledge, this study is aimed to examine the helminthic fauna found in *Channa*. Investigations of helminthic infection in these fish provide essential information for people to use for control and protection from parasites.

6. Proposed work Plan/ Formulation and Structure of Study:

Year- Wise Plan of Work and Targets to be Achieved:-

First Year:- Review of Literature, Referencing, Research methodology, visit to various localities of Nanded district for collection of helminthic fauna freshwater fish species of the genus *Channa*. Recording the obtained data for Population dynamics study. Collection and preservation of helminth parasites. To study Biochemical Profile (Glycogen, Protein and Lipid contents) of Helminths and its host tissue of genus *Channa*

Second Year:- Collection of helminthic fauna of freshwater fish species of the genus *Channa* from different localities of Nanded. Fixation, preservation, dehydration, staining and whole mount preparation of helminth parasites. To record the obtained data for population dynamics study. Data analysis. To study Biochemical Profile for Glycogen, Protein and Lipid contents of Helminths and its host tissue of genus *Channa*.

Third Year:- Collection, preservation, staining, mounting and identification of helminths on the basis of Systema Helminthum by S. Yamaguti. Morpho-taxonomic studies on helminth parasites of *Channa*. To record the obtained data for population dynamics study. Data analysis. To study Biochemical Profile for Glycogen, Protein and Lipid contents of Helminths and its host tissue of *Channa*.

Fourth Year:- Confirmation and finalization of obtained data for Biosystematics studies. Camera Lucida line drawings, morphometery, photomicrography, data analysis, drafting, typing and submission of thesis.

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